

an impurity region including a second impurity having an opposite conductive type to the first impurity and being formed under the channel forming region,

wherein a concentration of the second impurity in the channel forming region is from 1/100 to 1/10 of that in the impurity region,

wherein the second impurity is introduced from a direction of the  $\langle 110 \rangle$  axis with respect to the single semiconductor substrate, so that the second impurity is introduced from a perpendicular direction to a plane having the smallest atomic density of the single semiconductor substrate,

wherein the concentration of the second impurity in the impurity region is in a range of  $1 \times 10^{18}$  to  $1 \times 10^{19}$  atoms/cm<sup>3</sup>,

wherein the concentration of the second impurity in the channel forming region is in a range of  $1 \times 10^{16}$  to  $1 \times 10^{17}$  atoms/cm<sup>3</sup>.

3. A device according to claim 1,

wherein the impurity region is substantially not in contact with the source region and the drain region.

15. A device according to claim 1, wherein the semiconductor device is an integrated circuit (IC).

18. A device according to claim 1, wherein the semiconductor device is a microprocessor.

21. A device according to claim 18, wherein the microprocessor is at least one selected from the group consisting of a RISC processor and an ASIC processor.

24. A device according to claim 1, wherein the semiconductor device is at least one selected from the group consisting of a cellular phone, a personal handy phone system, and a portable computer.

27. A device according to claim 1, wherein the impurity region is formed at a depth in a range of 20 to 150 nm from a surface of the single semiconductor substrate.

28. A device according to claim 1, wherein the single semiconductor substrate is a single silicon substrate.

Sub D2  
C12  
29. (Amended) A semiconductor device comprising a plurality of MOSFETs formed in a single semiconductor substrate,

each of the plurality of MOSFETs comprising:

a source region and a drain region each including a first impurity;

a channel forming region being formed between the source region and the drain region;

an impurity region including a second impurity having an opposite conductive type to the first impurity and being formed under the channel forming region;

a pair of LDD regions, wherein one of the pair of LDD regions is formed between the source region and the channel forming region while the other of the pair of LDD regions is formed between the channel forming region and the drain region,

wherein a concentration of the second impurity in the channel forming region is from 1/100 to 1/10 of that in the impurity region,

*C<sup>2</sup> cont*

wherein the second impurity is introduced from a direction of the  $\langle 110 \rangle$  axis with respect to the single semiconductor substrate, so that the second impurity is introduced from a perpendicular direction to a plane having the smallest atomic density of the single semiconductor substrate,

wherein the concentration of the second impurity in the impurity region is in a range of  $1 \times 10^{18}$  to  $1 \times 10^{19}$  atoms/cm<sup>3</sup>,

wherein the second concentration of the impurity in the channel forming region is in a range of  $1 \times 10^{16}$  to  $1 \times 10^{17}$  atoms/cm<sup>3</sup>.

---

30. A device according to claim 29, wherein the semiconductor device is an integrated circuit (IC).

31. A device according to claim 29, wherein the semiconductor device is a microprocessor.

32. A device according to claim 31, wherein the microprocessor is at least one selected from the group consisting of a RISC processor and an ASIC processor.

33. A device according to claim 29, wherein the semiconductor device is at least one selected from the group consisting of a cellular phone, a personal handy phone system, and a portable computer.

34. A device according to claim 29, wherein the impurity region is formed at a depth in a range of 20 to 150 nm from a surface of the single semiconductor substrate.

---

*Sub Dy 3*

42. (Amended) A semiconductor device comprising at least a CMOS circuit including an n-channel MOSFET and a p-channel MOSFET each being formed in a single semiconductor substrate,

said n-channel MOSFET comprising:

a first source region and a first drain region each comprising a first n-type impurity;

a first channel forming region being formed between the first source region and the first drain region;

a first impurity region including a first p-type impurity and being formed under the first channel forming region;

said p-channel MOSFET comprising:

3  
cont  
a second source region and a second drain region each comprising a second p-type impurity;

a second channel forming region being formed between the second source region and the second drain region;

a second impurity region including a second n-type impurity and being formed under the second channel forming region,

wherein each of the first and second impurities is introduced from a perpendicular direction to a plane having the smallest atomic density of the single semiconductor substrate,

wherein a concentration of the first p-type impurity in the first impurity region is in a range of  $1 \times 10^{18}$  to  $1 \times 10^{19}$  atoms/cm<sup>3</sup>,

wherein a concentration of the first p-type impurity in the first channel forming region is in a range of  $1 \times 10^{16}$  to  $1 \times 10^{17}$  atoms/cm<sup>3</sup>

wherein a concentration of the second n-type impurity in the second impurity region is in a range of  $1 \times 10^{18}$  to  $1 \times 10^{19}$  atoms/cm<sup>3</sup>,

wherein a concentration of the second n-type impurity in the second channel forming region is in a range of  $1 \times 10^{16}$  to  $1 \times 10^{17}$  atoms/cm<sup>3</sup>.

43. A device according to claim 42,  
wherein the first n-type impurity is arsenic,  
wherein the second n-type impurity is phosphorus,  
wherein each of the first and second p-type impurity is boron.
44. A device according to claim 42, wherein the semiconductor device is an integrated circuit (IC).
45. A device according to claim 42, wherein the semiconductor device is a microprocessor.
46. A device according to claim 45, wherein the microprocessor is at least one selected from the group consisting of a RISC processor and an ASIC processor.
47. A device according to claim 42, wherein the semiconductor device is at least one selected from the group consisting of a cellular phone, a personal handy phone system, and a portable computer.
48. A device according to claim 42, wherein each of the first and second impurity regions is formed at a depth in a range of 20 to 150 nm from a surface of the single semiconductor substrate.
49. A device according to claim 42,  
wherein each of the first p-type and the second n-type impurities is introduced from a direction of the  $\langle 110 \rangle$  axis with respect to the single semiconductor substrate.